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REMARKS

Claims 1, 3, 5-10, 12, and 14-19 are all the claims presently pending in the application. Claims 1 and 18 have been amended to more clearly define the invention. Claims 14-17 have been withdrawn from prosecution. Of the remaining claims, claim 1 is independent.

Applicant appreciates the courtesies extended to Applicant's representative during the personal interview on November 15, 2005. During the personal interview, Applicant's representative asserted that none of the applied references teaches or suggests the features of the claimed invention including a magnetic disk apparatus with a switch for selecting either of one of the plurality of first printed-circuit boards simultaneously connected to the second printed-circuit board and another of the plurality of first printed-circuit boards simultaneously connected to the second printed-circuit board, where the first printed-circuit boards are paired with respective disk enclosures.

These amendments are made only to more particularly point out the invention for the Examiner and not for narrowing the scope of the claims or for any reason related to a statutory requirement for patentability.

Applicant also notes that, notwithstanding any claim amendments herein or later during prosecution, Applicant's intent is to encompass equivalents of all claim elements.

Entry of this §1.116 Amendment is proper. Since the Amendments above narrow the issues for appeal and since such features and their distinctions over the prior art of record were discussed earlier, such amendments do not raise a new issue requiring a further search and/or consideration by the Examiner. As such, entry of this Amendment is believed proper and Applicant earnestly solicits entry. No new matter has been added.

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Claims 1, 3, 5-10, 12, and 18-29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Takao, et al. reference in view of the Bemis reference.

This rejection is respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

An exemplary embodiment of the claimed invention, as recited by independent claim 1, is directed to a magnetic disk apparatus that includes a plurality of disk enclosures, a plurality of first printed-circuit boards which are paired with the respective disk enclosures, and a second printed-circuit board which is detachably connected to the plurality of first printed-circuit boards. Each of the plurality of first printed-circuit boards mounts circuits which have a first noise resistance property, and a circuit which holds parameters unique to a corresponding disk enclosure. The second printed-circuit board mounts circuits which have a second noise resistance property which is superior to the first noise resistance property. The circuits on the second printed-circuit board include a switch for selecting either of one of the plurality of first printed-circuit boards simultaneously connected to the second printed-circuit board and another of the plurality of first printed-circuit boards simultaneously connected to the second printed-circuit board. The second printed circuit board is detachably connectable to an upper system. The circuits on each of the plurality of first printed-circuit boards comprise a recording/reproduction control circuit.

Conventional magnetic disk apparatus have only a single printed-circuit board for a single disk enclosure. Such single printed-circuit boards mount all of the circuits for controlling the disk enclosure. Thus, when the disk enclosure is exchanged for another disk enclosure, all of the circuits for each disk enclosure must also be exchanged because all of the

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circuits are on the same single printed-circuit board as the disk. This leads to a wasted cost in replacing all of the circuits for each disk enclosure and maintains a high cost for such a disk exchange. It also limits miniaturization of such a disk enclosure

By contrast, the present invention provides a disk apparatus which includes two separate printed-circuit boards. A plurality of first printed-circuit boards (e.g., 21 and/or 22 in the exemplary non-limiting embodiment of Fig.2) includes the disk enclosure and is only required to also include those circuits which are unique to the disk enclosure (e.g., such as the exemplary parameter holding circuit 4 in Fig. 1). A second printed-circuit board (e.g., 23 in the exemplary non-limiting embodiment of Fig. 2) includes other circuits. Thus, when the disk enclosure requires an exchange with another disk enclosure, only those circuits on the first printed-circuit board are exchanged, thereby significantly reducing the cost of the exchange.

Additionally, the exemplary embodiment of the present invention includes a recording/reproduction control circuit on the first printed-circuit board. The recording/reproduction control circuit inputs and outputs high-frequency signals in order to control the circuit in the first circuit board such as the analog/digital converter.

If the recording/reproduction control circuit is placed in the second printed circuit board, then lines for the high-frequency signals become long to extend from the second printed circuit board to the first printed circuit board, whereby the high frequency signals in the long line strongly interfere with the recording signal, the reproduced signal and other signals, which may cause errors of the recording signal, errors of the reproduced signal and defective operation in the circuits of the first printed circuit board.

Further, if the recording/reproduction control circuit is placed in the second printed

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circuit board, then the high frequency is delayed due to capacitance between the long lines and ground. The phase delay of the high frequency is proportional to the frequency, and the phase delay causes a defective timing sequence for reading and writing data.

Therefore, it is effective to place the recording/reproduction control circuit in the first printed circuit board.

II. THE PRIOR ART REJECTION

The Examiner continues to allege that the Bemis reference would have been combined with the Takao et al. reference to form the claimed invention. Applicant submits, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

As explained during the personal interview, none of the applied references teaches or suggests the features of the claimed invention including a magnetic disk apparatus with a switch for selecting either of one of the plurality of first printed-circuit boards simultaneously connected to the second printed-circuit board and another of the plurality of first printed-circuit boards simultaneously connected to the second printed-circuit board, where the first printed-circuit boards are paired with respective disk enclosures.

Applicant notes that the Examiner alleges that the Takao et al. reference discloses a second printed circuit board 2b which is capable of simultaneously connecting two first printed circuit boards 2a by relying upon the disclosure of Figure 12 of the Takao et al. reference. Figure 12 of the Takao et al. reference appears to illustrate a single second printed circuit board 2b which includes two slots and corresponding two eject buttons 32. Therefore, the Examiner alleges that the single second printed circuit board 2b would be capable of

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simultaneously connecting to two first printed circuit boards 2a and, therefore, if two first printed circuit boards 2a are connected to the single second printed circuit board 2b that the single second printed circuit board 2b must necessarily include a switch for switching between the two first printed circuit boards 2a when both are inserted into respective slots on the single second printed circuit board 2b.

However, contrary to the Examiner's allegations, Figure 12 of the Takao et al. reference does not disclose a structure in which two first printed circuit boards 2a are simultaneously connected to the single second printed circuit board 2b. Rather, Figure 12 clearly discloses two second printed circuit boards 2b which may be connected to respective first printed circuit boards 2a. In other words, the Takao et al. reference does not disclose the features of the claimed invention including a switch on a second printed circuit board 2b for switching between two simultaneously connected first printed circuit boards 2a.

There is no reason to construe Figure 12 of the Takao et al. reference as disclosing a single second printed circuit board 2b having two simultaneously connected first printed circuit boards 2a. Such a construction is based on conjecture or surmise and is, therefore, not supported by the applied reference.

Rather, and in stark contrast to the Examiner's allegation, Figure 12 of the Takao et al. reference clearly discloses two first printed circuit boards 2a connected to their respective second printed circuit boards 2b. In other words, each of the two first printed circuit board 2a of the Takao et al. reference requires its own dedicated second printed circuit board 2b.

The Bemis reference does not remedy the deficiencies of the Takao et al. reference.

The Bemis reference discloses a circuit 400 that includes a switch for selecting either one of a plurality of drives A to F. However, each of drives A to F corresponds to a

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conventional magnetic disk apparatus including disk enclosure 82 and a single printed circuit board 81 as illustrated by Figure 5 of the present application.

These conventional magnetic disks A to F form a Redundant Array of Inexpensive Disks (RAID, Figures 6 and 7). The Bemis reference discloses the use of a spare disk drive within the RAID level 3 disk array in Figure 1 and that, in a personal computer, a RAID system is constructed by using a RAID PCI board or a RAID chip on a motherboard and a plurality of IDE hard drives (i.e. conventional magnetic disk apparatus).

In stark contrast, in accordance with an exemplary embodiment of the present invention, a magnetic disk apparatus with a switch for selecting either of one of the plurality of first printed-circuit boards simultaneously connected to the second printed-circuit board and another of the plurality of first printed-circuit boards simultaneously connected to the second printed-circuit board, where the first printed-circuit boards are paired with respective disk enclosures. In other words, the first printed circuit board is part of a printed circuit board in a conventional magnetic disk.

The switch that is disclosed by the Bemis reference does not correspond to the claimed switch because the switch that is disclosed by the Bemis reference does not select between a plurality of first printed-circuit boards which are paired with respective disk enclosures as recited by independent claim 1.

In other words, the target of the switch that is disclosed by the Bemis reference is completely different from the target that is recited by independent claim 1.

Further, the Bemis reference only discloses that the circuit 400 includes a switch for selecting either one of a plurality of drives A to F, and drives A to F are conventional magnetic disk apparatus, each of which corresponds to a set of the first printed circuit board

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and the second printed circuit board as recited by independent claim 1.

The switch on the second printed circuit board of independent claim 1 selects one of the plurality of first printed circuit boards. That is, independent claim 1 recites that the switch is part of a conventional magnetic disk apparatus. The switch that is disclosed by the Bemis reference is not part of a conventional magnetic disk apparatus.

Further, one of ordinary skill in the art would not have been motivated to modify the applied references as alleged by the Examiner. The Examiner appears to allege that it would have been obvious to modify the second printed circuit board 2b as disclosed by the Takao et al. reference to include a switch for switching between first printed circuit boards 2a as disclosed by the Bemis reference.

In particular, the Examiner alleges that switches for switching between a plurality of disks is notorious technology and that one of ordinary skill in the art would have been motivated to modify the second printed circuit board 2b to include a switch that switches between a plurality of first printed circuit boards 2a to obtain more approaches for storing information.

However, contrary to the Examiner's allegation, one of ordinary skill in the art would not have been motivated to modify the second printed circuit board 2b to include a switch for switching between first printed circuit boards 2a because there is no motivation to move a switch which is outside a magnetic disk apparatus to inside the magnetic disk apparatus.

Therefore, the Examiner is respectfully requested to withdraw the rejection of claims 1, 3, 5-10, 12, and 18-19.

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III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that claims 1, 3, 5-10, 12, and 14-19, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that I am filing this Amendment After Final Rejection Under 37 CFR §1.116 and Applicant's Interview Summary by facsimile with the United States Patent and Trademark Office to Examiner Chen, Group Art Unit 2652 at fax number (571) 273-8300 this 22nd day of November, 2005.


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